This is the 48th newsletter of the *Knowledge Centre Manoeuvring in Shallow and Confined Water*, which aims to consolidate, extend and disseminate knowledge on the behaviour of ships in shallow and confined water. In this newsletter, we present an item on CFD research that has been carried out for the JoRes project.

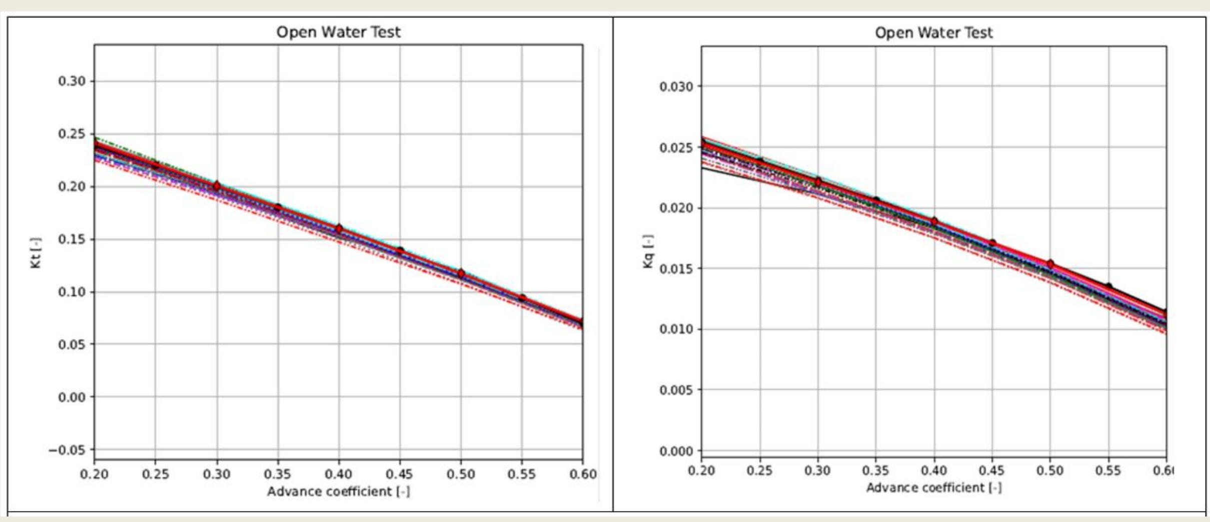
There is still some time to submit an abstract for the 6th MASHCON conference, which will be held in Glasgow from 22 to 26 May 2022. The conference will have a non-exclusive focus on port manoeuvres, where several shallow and confined water challenges are present. A lot of these manoeuvres occur in the vicinity of moored ships, leading to passing ship effects on moored ships.

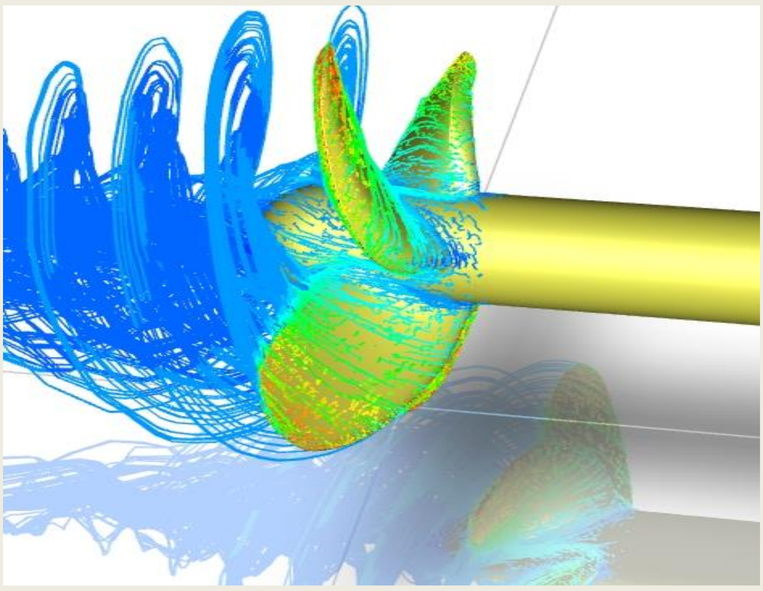
The conference organizers also welcome papers dealing with all aspects related to manoeuvring in shallow and confined water. Benchmark data are available for researchers wishing to validate numerical tools against experimental model test results. The benchmark data are available upon simple request.

Abstracts of 200 - 300 words can be mailed to info@shallowwater.be before 30 September 2021. Once accepted, authors will be expected to write and present a full paper, which will be reviewed by the international scientific committee. The 6th MASHCON conference is organized jointly by the University of Strathclyde, Ghent University and Flanders Hydraulics Research.

The Knowledge Centre is involved in the joint research project JoRes, which aims to develop an industry recognised benchmark for ship energy efficiency solutions. One of the main objectives is to increase confidence in numerical methods and to create a basis for further ship performance improvement and industry digitalisation. In order to achieve this, a full set of ship performance data are gathered by carrying out model tests, which are compared with results obtained with Computational Fluid Dynamics (CFD) calculations and with measurements at full scale, including PIV propeller flow measurements. In particular, one aim is to increase knowledge on the important but complex propeller/hull interaction effects. This will lead to a better understanding of ship hydrodynamics in full scale and to improvements in ship efficiency.

One of the main tasks of the JoRes project is to directly compare propeller open water performance to improve understanding of the correlation between model tests and to reduce the inherent numerical accuracy and uncertainties in modelling full scale flow. The four-bladed propeller of the MV Regal was selected as validation test case. Blind simulation results, which include propeller open water characteristics at full scale, are compared with the outcome of numerical computations for advance coefficients ranging between 0.2 and 0.6.





Among the workshop participants, the Maritime Technology Division of Ghent University carried out steady state numerical computations using a fine unstructured mesh containing 4 million cells. The turbulent flow was solved using the SST k-ω turbulence model which was implemented in a 3D commercial CFD solver. A moving reference frame was assigned to the fluid where the full-scale rotational speed of propeller was kept constant at 87 rpm. The computed results showed good agreement with experimental data and allowed to visualize the typical flow field around the propeller, for example to show the pressure coefficient distribution on the blade surface along with the propeller path lines coloured by velocity.

Researchers associated with the Knowledge Centre recently published:

Chen, C., Verwilligen, J., Mansuy, M., Eloot, K., Lataire, E., Delefortrie, G. (2021). Tracking controller for ship manoeuvring in a shallow or confined fairway: Design, comparison and application. Applied Ocean Research, 115, 102823. https://doi.org/10.1016/j.apor.2021.102823

Delefortrie, G., Vantorre, M. (2021). 6DOF manoeuvring model of KCS with full roll coupling. Ocean Engineering, Vol. 235, No. 109327. https://doi.org/10.1016/j.oceaneng.2021.109327

Delefortrie, G., Eloot, K. (2021) The effect of uncoupled propulsion and steering on the manoeuvring behaviour in coastal waters. Ocean Engineering, Vol. 235, No. 109347. https://doi.org/10.1016/j.oceaneng.2021.109347

Delefortrie, G., Van Hoydonck, W., Eloot, K. (2021). Forces and Torque acting on a Rudder while Manoeuvring. Journal of Marine Science and Technology. https://doi.org/10.1007/s00773-021-00840-y

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Marco S. Sotelo presented a poster entitled ''Experimental and numerical study of a cylinder passing through fluidized natural mud" by Marco S. Sotelo, Djahida Boucetta, Bart Brouwers and Guillaume Delefortrie at the International Conference on Cohesive Sediment Transport, which took place online and in Delft, The Netherlands from 13 to 17 September 2021. More explanation about the experiments can be found in this video.



Gael Verao Fernandez presented a paper entitled "Experimental Validation of a State Space Model of a Moored Cuboid in Waves" by Gael Verao Fernandez, Ajie Pribadi, Minghao Wu, Vasiliki Stratigaki, Peter Troch and Evert Lataire at the 14th European Wave and Tidal Energy Conference, which took place online and in Plymouth, UK from 5 to 9 September 2021.

Knowledge Centre
Manoeuvring in Shallow and Confined Water

Berchemlei 115
2140 Antwerp
Belgium
T +32 (0) 3 224 60 35
E info@shallowwater.be

www.shallowwater.be